

BAZMADZHIAN, R.A.; KARAUSSYAN, T.V.; TER-MIKAELYAN, T.M.

Programmed realization of the algorithm of Armenian-Russian
translation. NTI no.12:42-43 '63. | (MIRA 17:6)

DURGARYAN, I.S.; TER-MIKAELEV, T.P.

Some considerations on the structures of specialized digital
computers for the translation of languages. NTI no.2:44-46 '64.
(MIRA 17:6)

TER-MIKHAELIAN, T. V.

"Determinations of the Harmonic Measure of Sets on Some Rectifiable Curves." Sub
20 Jun 51, Sci Res Inst of Mechanics and Mathematics, Moscow Order of Lenin State Univ i
M. V. Lomonosov.

Dissertations presented for science and engineering degrees in Moscow during 1951.

SO: Sum. No. 430, 9 May 55.

TER-MIKAYELYAN, T.M.

Continuity of univalent functions in closed domains bounded by
certain rectifiable curves. Izv.AN Arm.SSR.Ser.FMET nauk 5 no.2:
11-27 '52. (MLRA 9:8)

1. Sektor matematiki i mekhaniki Akademii nauk Armyanskoy SSR.
(Function) (Surfaces)

TER-MIKAELYAN, *T.M.*

110-10-3/18

AUTHOR: Sakharov, I.E., Candidate of Phys.Math. Sciences, and
Ter-Mikaelyan, T.M., Candidate of Phys.Math.Sciences.

TITLE: Calculation of the Critical Speeds of a Turbo-generator
Rotor on Elastic-massive Supports using an Electronic
Computer. (Raschet na elektronnoy schetnoy mashine kriti-
cheskikh skorostey rotora turbo-generatoria na uprugo-mass-
ivnykh oporakh)

PERIODICAL: Vestnik Elektropromyshlennosti, 1957, Vol.28, No.10,
pp. 9 - 17 (USSR)

ABSTRACT: Turbo-generators with an output of greater than about 6 MW
are made with flexible shafts and the working speed is above
a critical speed. In designing a rotor it is important to be
able to ensure that the working speed is at least 20-30% away
from the critical speed. This article deals with the influence
of give, or pliability of the support bearings of the turbo-
generator on the critical speeds of the rotor. The problem is
solved accurately by means of a computer. The critical speeds
are determined as roots of a characteristic equation obtained
from boundary conditions and conditions of continuity of geo-
metrical and power factors at places of step-wise change in
the section of the rotor on the assumption that the rotor con-
sists of a number of parts of constant section to each of which

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Calculation of the Critical Speeds of a Turbo-generator Rotor on
Elastic-massive Supports using an Electronic Computer.

the equations of oscillation of a beam are applicable. The results of the calculation graphically show the relationship between the critical speeds and the various amounts of give in the two bearings. The results may be compared with calculations of critical speed made by the usual graphical methods.

The formulation of the equation for determination of the critical speeds is then described. The turbo-generator rotor is considered as a beam consisting of a number of sections of different rigidity with a common axis with elastic massive end supports. The equations and boundary conditions are given. The equations required to determine the critical speeds in a rotor consisting of eleven different sections are given in Table 1.

The procedure of calculation for a rotor of eleven sections is then described. Allowance was made for the rigidity of the copper and wedges in the slot. Seven values of static elasticity were used for each support, taking the weight of the support as ten tons. Engineer L.P. Friedman participated in the derivation of the formulae. The equation for the critical speeds is given and appropriate characteristics for the rotor and the supports are taken from Tables 2 and 3. There is a total of card 2/4 28 variants which makes the problem very complicated but simpli-

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Calculation of the Critical Speeds of a Turbo-generator Rotor on
Elastic-massive supports using an Electronic Computer.

fying assumptions are explained. The application of the equation to a large electronic computer with a memory system containing 1 024 cells is explained. The way in which the method was simplified to adapt it to the computer is explained. The final programme contained 251 orders whilst a further 81 cells were occupied by standard signs and constants used in the programme. Engineer B.I. Kuznetsov participated in the work. Four constants were located in an external memory device to which reference had to be made 28 times. Each variant was worked out in rather less than two minutes which corresponds to approximately a million operations per variant. It is not difficult to extend this programme to a rotor with a greater number of sections. Therefore, once the programme has been drawn up it can be used for practically any turbo-generator rotor. It is, of course, necessary each time to substitute fresh initial data.

The four first critical speeds of the rotor were determined for the variants given in Tables 2 and 3. The results are given in Figs. 2, 3, 4 and 5. The yield of one of the supports is plotted on the abscissa and the yield of the other is the parameter of a family of curves giving the values of the critical speed. Fig. 6 gives the first four critical speeds as a function

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- Calculation of the Critical Speeds of a Turbo-generator Rotor on
· Elastic-massive supports using an Electronic Computer.

of the yield of the supports for the case when both supports have the same dynamic characteristics. The graphs show that, within the range investigated, variations in the yield of the supports has little influence on the first critical speed but much more influence on the higher critical speeds. A practical example is given based on data obtained from a power station. It is shown that the effect of yield in the supports is to reduce the first critical speed by 6% and the second by 25%.

The calculations demonstrate the effectiveness of computers in solving new problems of turbo-generator design connected with reduction of vibration.

There are 6 figures, 3 tables and 1 Slavic reference.

ASSOCIATION: Scientific Research Institute of the Electro-technical Industry. (NII EP) and Institute of Mathematics and Mechanics of Ac.Sc. Armenian SSR. (Institut Matematiki i Mekhaniki AN Arm. SSR)

SUBMITTED: June 17, 1957

AVAILABLE: Library of Congress
Card 474

PHASE I BOOK EXPLOITATION

sov/1237

Kagan, Boris Moiseyevich and Ter-Mikaelyan, Teodor Mikhaylovich

Resheniye inzhenernykh zadach na avtomaticheskikh tsifrovых vychislitel'nykh mashinakh (Solution of Engineering Problems by Means of Automatic Digital Computers) Moscow, Gosenergoizdat, 1958. 174 p. 10,000 copies printed.

Ed.: Kurochkin, V.M.; Tech. Ed.: Larionov, G.Ye.

PURPOSE: The book is intended for scientific personnel, engineers, and graduate and senior students of vuzes.

COVERAGE: The authors describe the application of automatic digital computers for engineering calculation and analysis. They discuss the principle of operation of computers and describe methods of programming mathematical problems and methods of approximate calculation. They also present examples of employing automatic digital computers in solving general engineering problems, such as the analysis of transients in long-distance power transmission, calculation of automatic control system stability, determination of critical speed of turbogenerator rotors, and searching

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Solution of Engineering (Cont.)

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for an economical type of motor. According to the authors, the material in Chapters 3 and 4, in particular Section 1 of Chapter 4, is based largely on lectures delivered by Professor A.A. Iyapunov at Moscow University in 1954-1955 and on the ideas developed jointly by him and a group of mathematicians at a seminar on computer mathematics. It is also stated that the material in general is based on the experience of the authors who, together with members of LUMS AS USSR, NII EP Gosplan USSR, and AS Armenian SSR, participated in developing the M-3 computer and in solving with it a number of engineering problems. Chapters 2,6,7,8 and Sections 1,2,4 of Chapter 1 were written by E.M. Kagan, and Chapters 3,4,5,9 and Sections 6,7,8,9 of Chapter 1 were written by T.M. Ter-Mikaelyan. The authors thank Professor A.A. Iyapunov and Docent V.M. Kurochkin for their advice during preparation of the text. There are 38 references, of which 26 are Soviet (including 4 translations) and 12 English.

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Ch. 1 Basic Concepts	7
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L 757-64

ACCESSION NR: AT3002332

S/2582/63/000/009/0139/0161

AUTHOR: Ter-Mikaelyan, T. M. (Yerevan)

X3

TITLE: Programming of branching processesSOURCE: Problemy kibernetiki, no. 9, 1963, 139-161

TOPIC TAGS: computer, electronic, ATsVM, game, game theory, branching, process, program, programming, Lyapunov method, operator, method, tic-tac-toe.

ABSTRACT: With reference to A. A. Lyapunov's proposal for the solution of problems on the ATsVM computer to develop an operator method for programming, in which the setting up of the program itself is preceded by the setting up of the so-called logical schemes, and in which frequently problems with entirely diverse content are reduced to calculation schemes with a singular structure, the present paper endeavors to facilitate standardization and automatization of the program by studying the schemes of programs of different classes of such problems. The paper examines a class of problems with "branching" processes, the solution of which on the ATsVM leads to a programming of calculation schemes given by recurrent relationships. The first section of the paper examines two examples of problems of this type; the second section sets up the programming scheme for the solution of

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such problems on the ATsVM. The terminology employed is that of A. A. Lyapunov (On logical programming schemes. In Sbornik "Problemy kibernetiki (Problems of cybernetics)", no.1, Fizmatgiz, 1958). The first example examined is that of a game; the following problem is posed: Starting from any given game situation, scan all possible further developments of that game and, on the basis of that scanning, select a move that will ensure victory if such is possible at all. The game (tic-tac-toe) is assumed to be played between a human player and the ATsVM. The second problem (suggested to the author by A. G. Gyul'misaryan and O. K. Bogaryan) deals with the branching calculation process involved in the examination of a function of 3 variables, $G(x, y, z)$, which obeys a specified condition at the origin and a differential relationship throughout the space $0 \leq x, y, z \leq 1$ and for which the value of G for $z = 1$ is to be found. Orig. art. has 6 tables and 16 numbered equations.

ASSOCIATION: 00

SUBMITTED: 03Nov61 DATE ACQ: 06Jun63 ENCL: 00

SUB CODE: CP, CO, CG, MM NO REF SOV: 003 OTHER: 000

Card2/2

SRAPYAN, Sh.O. (Yerevan); TER-MIKAELEYAN, T.M. (Yerevan)

One method for evaluating the situation in a game of crosses and zeros.
Probl. kib. no.9:171-176 '63. (MIRA 1710)

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755420001-6

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CIA-RDP86-00513R001755420001-6"

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755420001-6

... COMMERCIAL MACHINES AND EQUIPMENT

APPROVED FOR RELEASE: 07/16/2001

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"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755420001-6

TER-MIKAELEYAN, T.M. (Yerevan)

Programs with a varying order of completion of cycles. Probl.
kib. no.12:155-163 '64. (MIRA 18:6)

APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755420001-6"

BAZMADZHYAN, R.A. (Yerevan); BELETSKIY, M.I. (Yerevan); GRIGORYAN, V.M.
(Yerevan); GYUL'MISARYAN, S.A. (Yerevan); KARAUSTAYAN, T.V.
(Yerevan); MAKSUDIAN, L.S. (Yerevan); POGOSOVA, S.S. (Yerevan);
TER-MIKAELEYAN, T.M. (Yerevan); FEL'DMAN, Ye.D. (Yerevan)

Algorithm for Armenian-to-Russian machine translating. Part 1:
General description. Probl. kib. no.14:219-244 '65.
(MIRA 19:1)

1. Submitted Jan. 23, 1964.

L 63328-65 EWT(d)/T Pg-4/Pn-4--IJP(c)
ACCESSION NR: AP5017613

UR/2582/65/000/014/0221/0244

4

7

35
39

AUTHOR: Bardadashyan, R. A. (Yerevan); Balatashly, M. I. (Yerevan); Grigoryan, V. N. (Yerevan); Gyul'misaryan, S. A. (Yerevan); Karauntyan, T. V. (Yerevan); Makaudyan, L. S. (Yerevan); Pogosova, S. S. (Yerevan); Tor-Mikaelyan, A. M. (Yerevan); Vel'dman, Ya. D. (Yerevan)

TITLE: An algorithm for Armenian-Russian machine translation. I (General description)

SOURCE: Problemy kibernetiki, no. 14, 1963, 221-244

TOPIC TAGS: translation algorithm, machine translation, syntactic analysis, syntactic synthesis, idiom identification

ABSTRACT: The algorithm for Armenian-Russian machine translation whose general description is presented in this article is based on the principle of independent analysis and synthesis. This means that during the first stage of the operation the machine carries out the grammatical and meaning analysis of the Armenian text while during the second it synthesizes the corresponding Russian text on the basis of the information gathered during the analysis. The authors outline the structure of the dictionary and the method of morphological synthesis of the Russian con-

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tence and describe the labels used by the algorithm during the syntactic analysis and label synthesis. They also describe procedures for arriving at the correct meaning of multiple meaning words and for the identification of idioms. The article concludes with four examples of translation of mathematical texts. "The authors thank V. V. Ivangy, O. S. Kulagina, I. A. Mel'chuk, T. N. Moloshnaya and V. A. Uspenskiy for their help, fruitful ideas and valuable advice." Orig. art. has: 13 formulas and 2 tables.

ASSOCIATION: None

SUBMITTED: 23Jan64

ENCL: 00

SUB CODE: DF

NO REF Sov: 011

OTHER: 000

Card KC
2/2

L63325-65 EKT/EED-2/EWT(d)/T/EWP(1) Pg-l₄/Pk-l₄/Pg-l₄ IJP(c) CG/EB
ACCESSION NR: AP5017614 UR/2582/65/000/014/0245/0266

13
39
B

AUTHOR: Abelyan, M. G. (Yerevan); Bazmazhyan, R. A. (Yerevan); Gabrielyan,
E. P. (Yerevan); Malik-Adamyan, Zhe. E. (Yerevan); Karaustayan, T. V. (Yerevan);
Ter-Mikaelyan, T. M. (Yerevan)

TITLE: "Algorithm for Armenian-Russian machine translation. II (Realization of
the program)

166

SOURCE: Problemy kibernetiki, no. 14, 1965, 245-266

TOPIC TAGS: translation algorithm, machine translation, sentence coding

ABSTRACT: This is the second part of a paper describing an algorithm for Armenian-Russian machine translation developed at the Vychislitel'nyy Tsentr (Computer Center) AN Arm. SSR and YerGU. It describes the realization of the program of the algorithm on an automatic digital computer having a 2048-cell operative and 4096-cell outer memory. The basic principles of all the concepts utilized are due to O. S. Kulagina (Problemy kibernetiki, no. 2, 1959, 289-302). An outline of the algorithm's structure and the method of sentence coding is followed by a description of the scheme of the algorithm and of all the auxiliary information. A brief summary of the master and interpretation programs is also

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L 63325-65

ACCESSION NR: AP5017614

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given. "The authors sincerely thank M. I. Belatskiy, O. S. Kulagin, and L. A. Mel'chuk. They also thank I. D. Zaslavskiy who was very helpful during the writing of the first two sections of this article." Orig. art. has: 12 formulas, 9 figures, and 1 table.

ASSOCIATION: None

SUMMITTED: 12Jul63

ENCL: 00

SUB CODES: DF

NO KEY Sov: 004

OTHER: 000

Card

KC

2/2

"APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755420001-6

TER-MIKAEVANTS, G.S., inzh. (Leningrad); TSVYER, K.D., inzh. (Leningrad).

Utilizing inspection pits of steam locomotive stations in introducing
new types of traction. Elek. i tepl. tiaga 2 no.3:30 Mr '58.
(Railroads--Buildings and structures) (MITRA 11:4)

APPROVED FOR RELEASE: 07/16/2001

CIA-RDP86-00513R001755420001-6"

TER-MINASYANTS, S.M.

Problem of diffraction of a plane wave on a wedge moving at
supersonic speed. Dokl. AN SSSR 155 no. 4:775-778 Ap '64.
(MIRA 17:5)

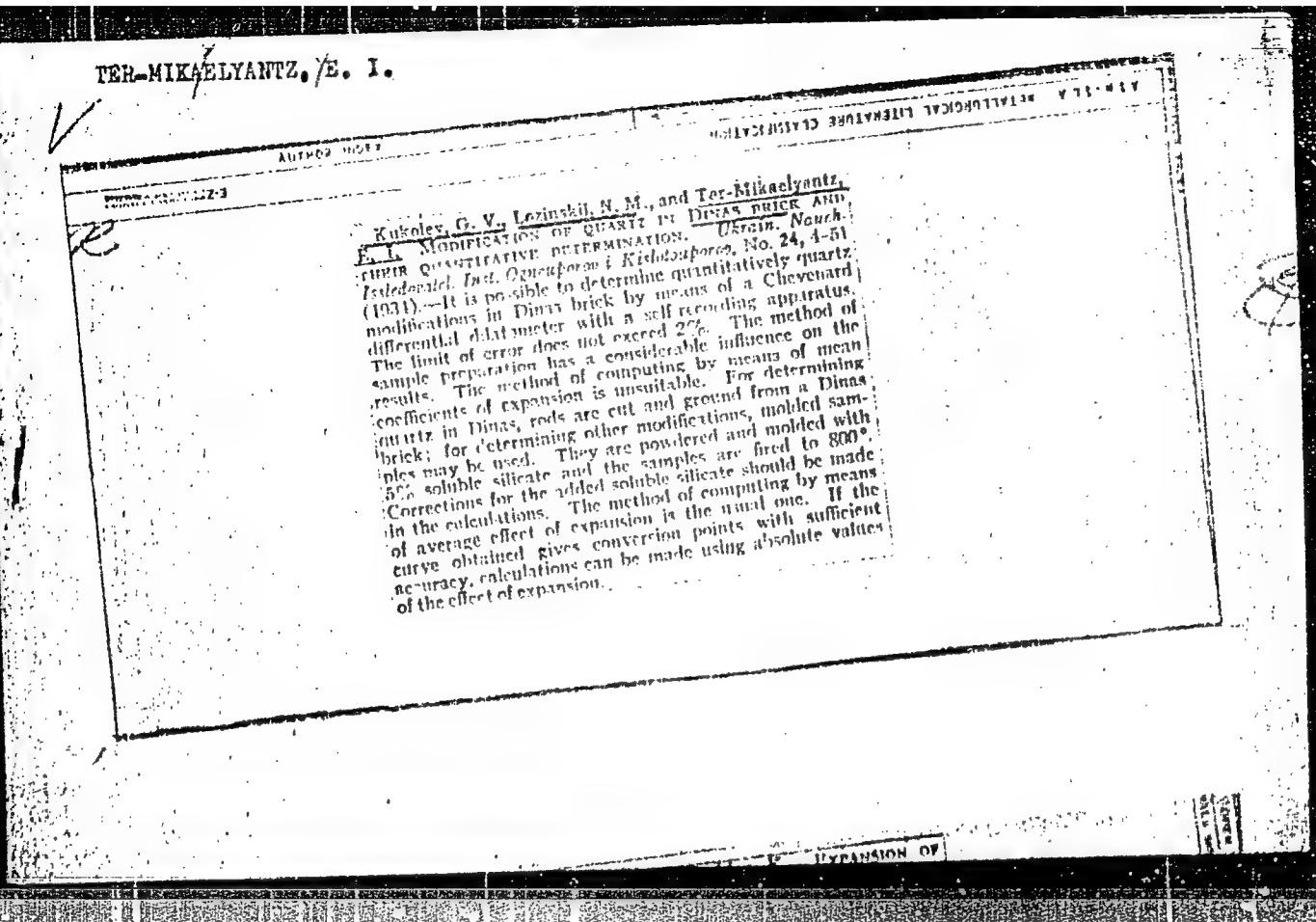
1. Predstavлено академиком L.I.Sedovym.

Leciaschi, N. M. and Ter-Mikaelyan, E. I. INFLUENCE OF CARBON MONOXIDE ON GROG MATERIALS. *Industria*, 2 [12], 18-20 (1934).—Investigations on the influence of carbon monoxide on refractories have been made by the Ukrainian Refractories Institute. Pure carbon monoxide, obtained by thermal decomposition of formic acid and cleaned by washing in alkaline solution of pyrogallol and potassium lye and dried afterward, was taken. The sample was introduced into a furnace and heated to 475° (the temperature at which carbon evolves according to the reaction $2\text{CO} \rightarrow \text{CO}_2 + \text{C}$ at the greatest rate). Carbon monoxide was introduced in the heated furnace at a rate of 0.5 liter/hr. To investigate the catalytic action of iron compounds, tests were undertaken with magnesite, hematite, metallic-iron sawdust, and pyrite. The exposure to the influence of CO taking 6 hr. with every sample to the catalytic activity falls in the order named. To obtain data on the influence of CO on refractories produced under different technical conditions, a series of samples produced under refractory clay and 60% grog were prepared, with the above-named metallic additions in a proportion of 3 to 6%. The samples were fired at 1000, 1100, 1200, 1300, and 1400° C. Samples made with more coarse additions disclosed a

higher rate of evaporation. Those fired at higher temperatures disclosed a much greater resistance to the action of CO than those fired at lower temperatures; this is especially true for the temperatures of 1300° and 1400°. The samples fired under 1200° crumbled away into powder after the investigation, and those fired at higher temperatures fell into large pieces, which is explained by the growth of mechanical strength resulting from sintering of 5 to 10% of metal from amorphous quantities by additions plus prepared in this way did not corrode under the influence of carbon monoxide during 120 hr. A microchemical analysis of the samples tested demonstrated that the iron

It is not reduced to the metallic state which proves
that the action belongs not to metallic iron but

TER-MIKAELEYANTZ, E. I.



Artificial clay-like state of highly refractory minerals.
B. Ya. Fines and E. I. Ter-Mikacyants. Operavjoruz 4.
74-84(1936).—By wet grinding in a ball mill plastic
masses were obtained from dead burnt magnesite, chro-
mite, quartzite, synthetic spinel and similar magnesite, refrac-
tory materials. These masses had a low melting point
beginning at 860°. Bricks made from a low melting point
than the usual bricks made from similar them were better
plastic masses may be used also as binding material. These
hot repairs.
R. Z. Stefanovitch

CO 19

Determination of mechanical properties of refractories at high temperatures. B. Ya. Pines and M. I. Tsvetkov. Ogneupory 4, 181-7 (1931).—A specially constructed device permits tests up to 1700°. A KCC-C thermocouple was used for temp. measurements. With small cubes (1 cm.) even of nonhomogeneous materials (Na_2O) reliable data were obtained. Based on work done with MgCO_3 , SiO_2 , dunts, MgC , etc., it was found that softening under load corresponds not to the beginning of softening, but to an advanced stage of "flow" of the material. E. H. Stefanowsky

SOURCE CODE: UR/0252/66/043/002/0091/0095

ACC NR: AP7005542

AUTHOR: Ter-Mikayelyan, M. L. (Corresponding member AN ArSSR); Arutyunyan, V. M.

ORG: Physics Institute, Yerevan (Fizicheskiy institut); Joint Radiation Laboratory of the Academy of Sciences of the Armenian SSR and of the Yerevan State University (Ob'yedinennaya radiatsionnaya laboratoriya Akademii nauk Armyanskoy SSR i Yerevanskogo gosudarstvennogo universiteta)

TITLE: Equations of a resonant medium

SOURCE: AN ArSSR. Doklady, v. 43, no. 2, 1966, 91-95

TOPIC TAGS: resonance scattering, electromagnetic interaction, multipole order, quantum electrodynamics, operator equation, quantum oscillator

ABSTRACT: This is a continuation of earlier work (Vestnik YeGU, no. 2, 1966), where a theory was developed for the passage of electromagnetic radiation through a resonant medium, without concrete assumptions made concerning the multipolarity of the transition. In the present article the authors use averaging of the operator equations of quantum electrodynamics to derive exact quasiclassical equations for a resonant medium. They start from the Hamiltonian for a system of two-level atoms in a radiation field and establish the connection between the vector potential and the transition current by using the rule for differentiating operators in quantum mechanics. The result is an analogy of quasiclassical equations for a resonant medium, but much simpler in form. The final equations coincide with those obtained in an earlier paper for an amplifier.

Card 1/2

ACC NR: AP7005542

A similar procedure can be used to derive the equations for a one-dimensional oscillator. Orig. art. has: 17 formulas.

SUB CODE: 20,12 / SUBM DATE: 00/ ORIG REF: 003

Card 2/2

TERMINASOV, I. (Leningrad)

"Roentgenographische Untersuchungen des Zerstoerungsmechanismus durch
Dauerbruch von Eisen- und Nictesenein- sowie -vielkristallen"

paper presented at the X Berg- und Huettenmaennischer Tag held from 28 to 31
May 1958 in Freiberg/Saxony, East Germany.

Metallkunde, July 1958.

On file in the German Section.

TERMINASOV, I.

X-ray examination of a metal structure resulting from static or dynamic deformation at normal and low temperatures. p. 43.

HUTNICKE LISTY. (Ministerstvo hutniho prumyslu a rundnych dolu a Ceskoslovenska vedecka spolecnost pro hutnictvi a slevarenstvi)
Brno, Czechoslovakia, Vol. 14, No. 1, Jan. 1959.

Monthly List of East European Accession, (EEAI), LC, Vol. 8, No. 12, Dec. 1959.
Uncl.

TERMINASOV, I., SERGEYeva, V. D.

"~~DX-2~~. X-Ray Study of Distortions in Steel Structure Due to Wear and Tear."

Inst. of Economic Engineers, Marot Street 27, Leningrad, USSR.

paper submitted for 5th Gen. Assembly, Symposium on Lattice Defects, Intl. Union of Crystallography, Cambridge U.K. Aug 1960.

TERMINOV, I., BUYKO, V. (M.)

"~~10-13~~. X-Ray Investigation of Fatigue in Metals."

Inst. of Economic Engineers, Marot Street 27, Leningrad, USSR.

paper submitted for 5th Gen. Assembly, Symposium on Lattice Defects, Intl. Union of
Crystallography, Cambridge U.K. Aug 1960.

TER-MINASOV, R.Ya.

616. Meter for consumption of coal by volume for boilers with chain grates.
Lyadov, S.L. and Ter-Minasov, R.Ya. (Za Ekonom. Topliva (Fuel Econ.) Mar. 1952
36, 37).

A short description is given, with diagrammatic illustrations. A counter
is connected with the chain grate through a friction cone so that the ratio be-
tween the velocities of grate and counter is controlled by the height of the fuel
bed. An accuracy of 1 to 3.5% is claimed. (L)

immediate source clipping

THE-MINASOV, V.

At the building sites of Sumgait. Prof.-tekhn.obr. 17
no.5:9-10 My '60. (MIRA 13:7)

1. Direktor tekhnicheskogo uchilishcha No.1 (g.Baku).
(Baku--Education, Cooperative)

TER-MINASOV, V.

Exhibition of Azerbaijani talent. Prof.-tekhn. obr. 20 no.6:23
Je '63. (MIRA 16:7)
(Technical education--Exhibitions)

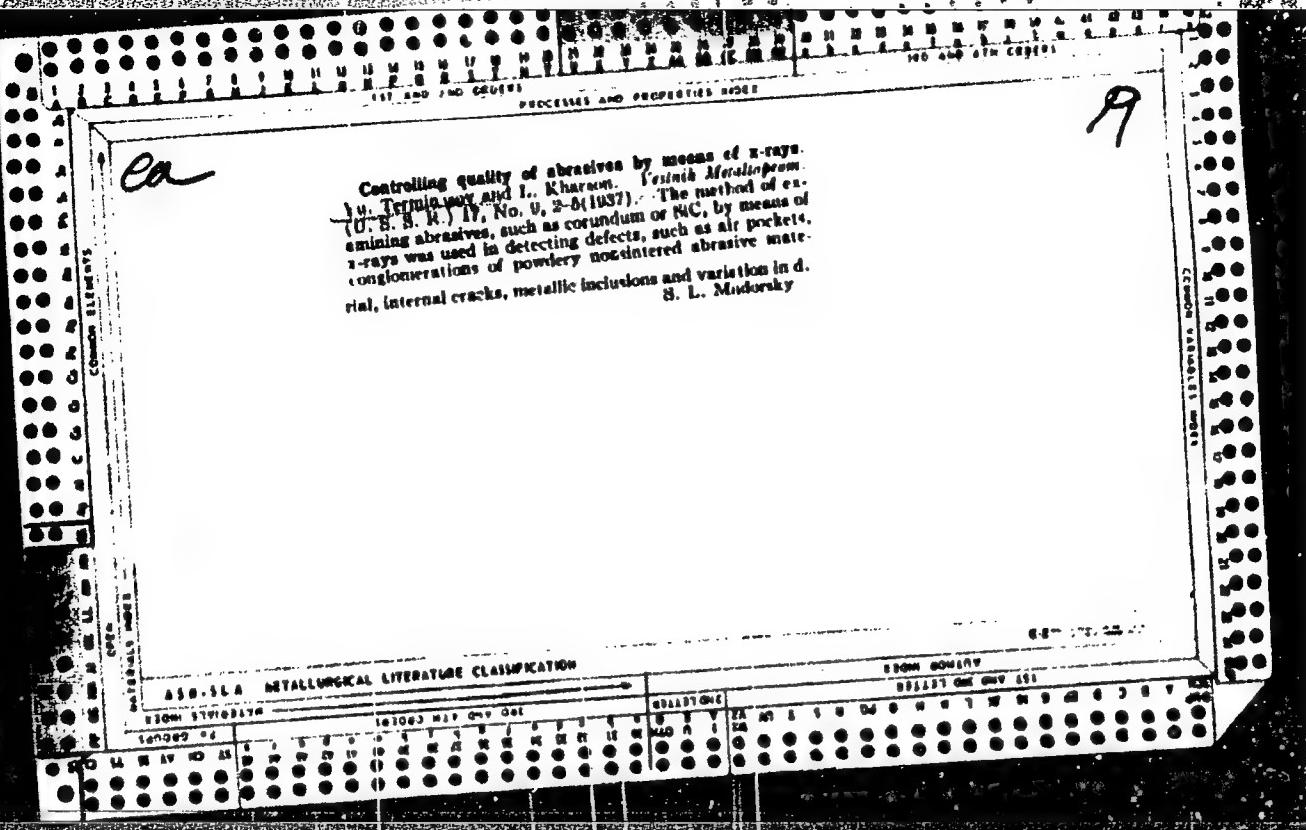
KOMAR, A. ; TERMINASOV, Yu.

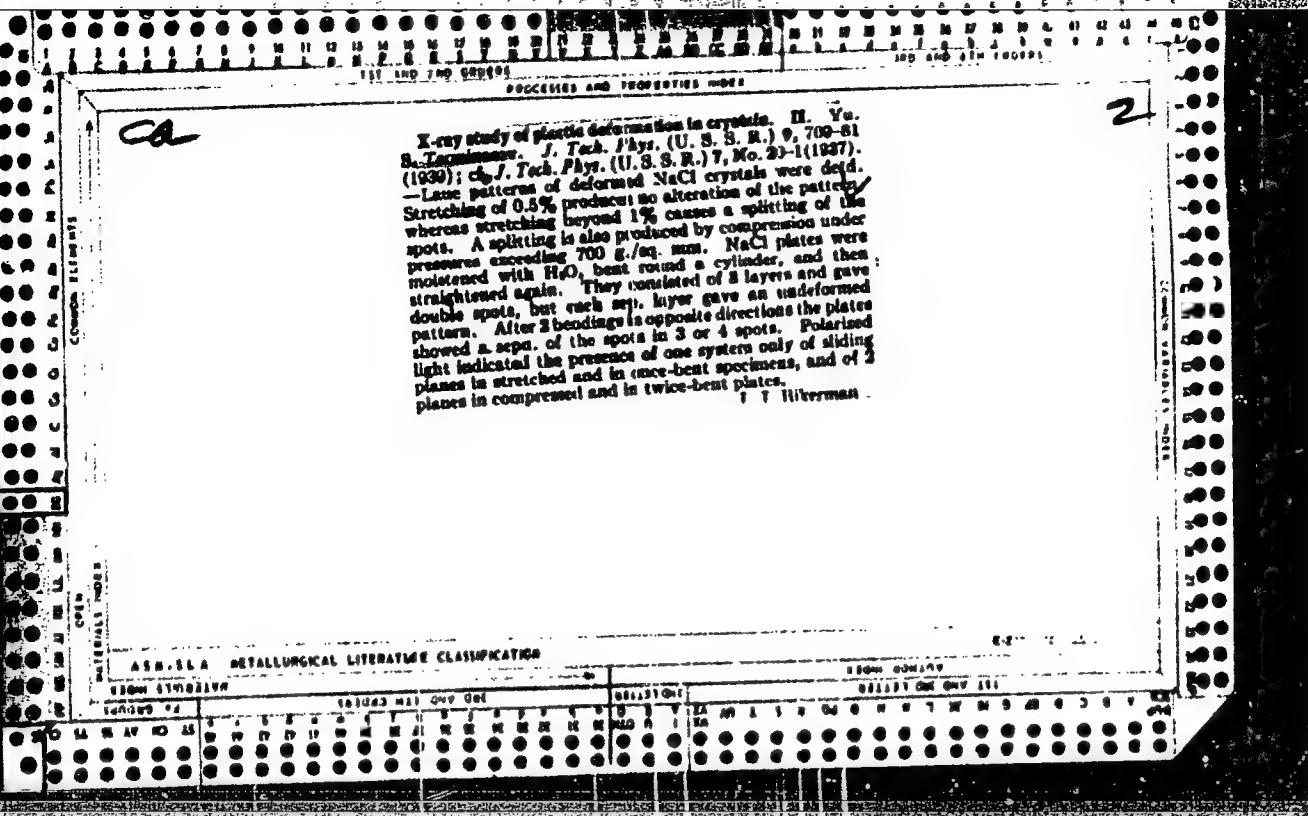
The X-Ray Study of Transformer Steel

ZhTF 6, 254, 1936

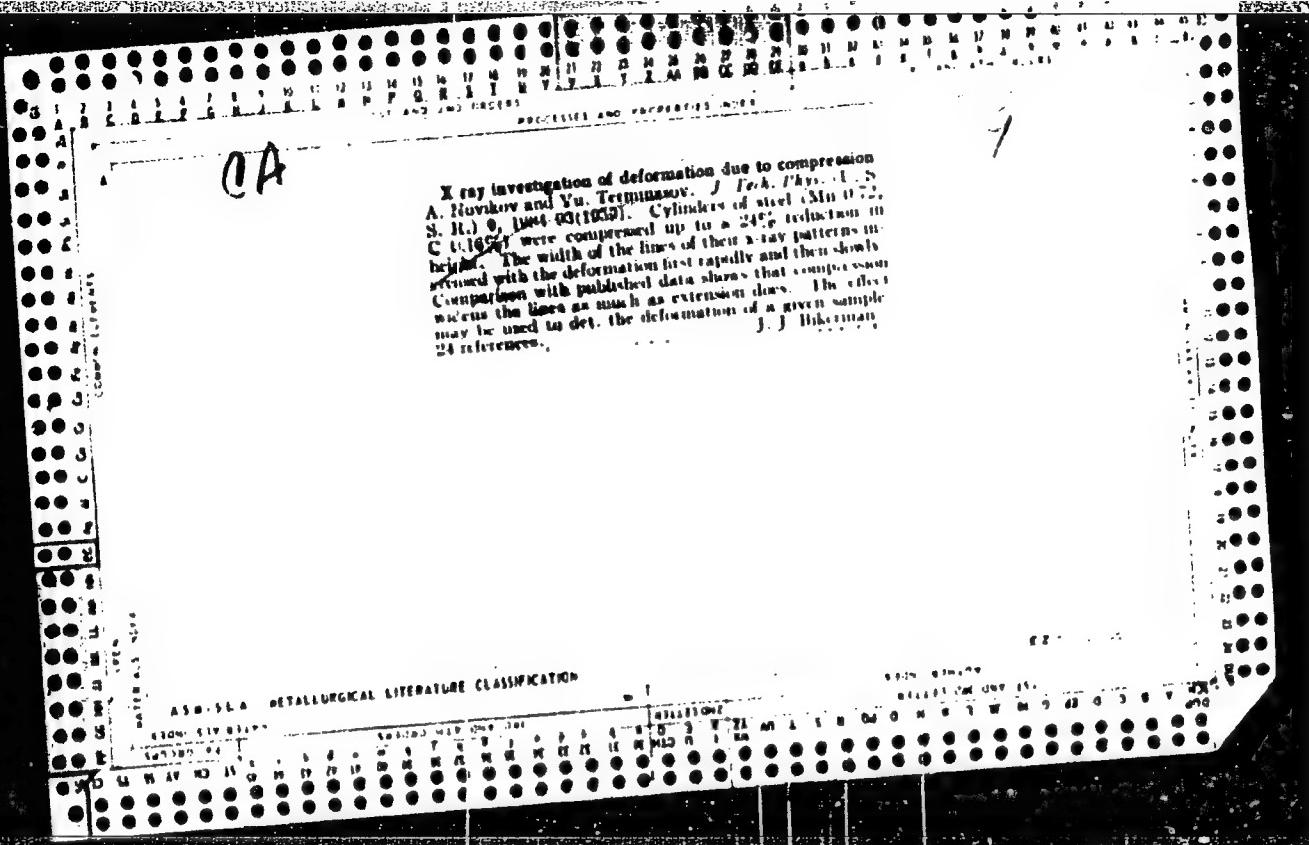
M
Explanation of the Role of Translation and Rotation in Plastic Deformation.
I. Kuznetsov and Yu. Terninov (Zhur. Tehnich. Fiziki (J. Tech. Phys.), 1937,
7, 1979-1989; Chem. Zentr., 1938, 109, (11), 1905.- (In Russian.) X-ray studies
of plastically deformed aluminium by the method of Komar (cf. Met. Abs., 1936
3, 255) showed that the lack of distinctness of the Laue reflections is caused
for the most part not by local changes in orientation, but by a progressive
macroscopic change in orientation as the result of the irregular distribution
of the deformation. The indistinctness or fading can be quantitatively obtained
from the distribution of the deformation. X-ray photographs of bent sodium
chloride crystals either showed a pattern no different from that of the unbent
crystal or showed irregularly blackened, deformed Laue reflections. These find-
ings can be explained by unbalanced translational displacement of the crystal dur-
ing the crystal during the deformation.

A10-114 METALLURGICAL LITERATURE CLASSIFICATION





X-ray investigation of the plastic deformation of crystals. III. M. B. Tsvetkovskaya, J. Tech. Phys. (U. S. S. R.) 19, 1740 (1954) et C. A. 50, 7034.—Cylinders of NaCl, 10 cm. long and 8 mm. wide, were extended up to 4%. This did not affect the X-ray pattern of the middle of the cylinder, but the parts of the cylinder distant 1 cm. or more from the middle showed double spots, and the deformation increased from the inner to the outer layers of the cylinder. Measurements of the thickness proved that the middle part was also extended but in it a pure translation took place. No "twining of a special kind" could be detected. J. J. Bikerman



m
X-Ray Study of the Mechanism of Failure of Metals by Fatigue. G. Kagan and Yu. Terminskiy (Zhur. Tekhn. Fiziki, 1940, 10, 781-785; Chem. Zentr., 1941, 112, (II), 273).—[In Russian.] A review of the literature reveals that no complete explanation has so far been found which covers the mechanism of fatigue failure in all circumstances.

ea

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X-ray study of the fracture of rail steel due to fatigue
 V. I. Terminasov and G. Kagan. *J. Tech. Phys.* (U. S. S. R.) 10, 87-95 (1940).—The investigations of rail steel ($M_{7-8}M$) show that: (1) For tensions higher than the limit of fatigue, the grains become smaller. The size of grain depends on the period of applied force. (2) There is no sharp transition from tensions above the fatigue limit to those below that limit. The changes become noticeable above 5 million cycles and steadily increase up to 10 million cycles. Above that value no changes can be observed. (3) For the periodic tensions surpassing the fatigue limit there are observed tensions of the second kind affecting width of $K\alpha$ doublet. For tensions considerably higher than the fatigue limit the width of $K\alpha$ doublet increases still more; this is ascribed to the presence of grains smaller than 10^{-6} cm. in diam. (4) For tensions which are 1.2 kg. lower than the fatigue limit, there are observed tensions of the second kind equal to those appearing above that limit. (5) The changes in the lattice begin when the limit of fluidity is reached. (6) The lattice changes due to fatigue correspond to the changes taking place in case of static tensions on the limit of fluidity, or to those resulting from the stretching by 2 or 3%. Rokalskaya Gamev

AMERICAN METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 07/16/2001

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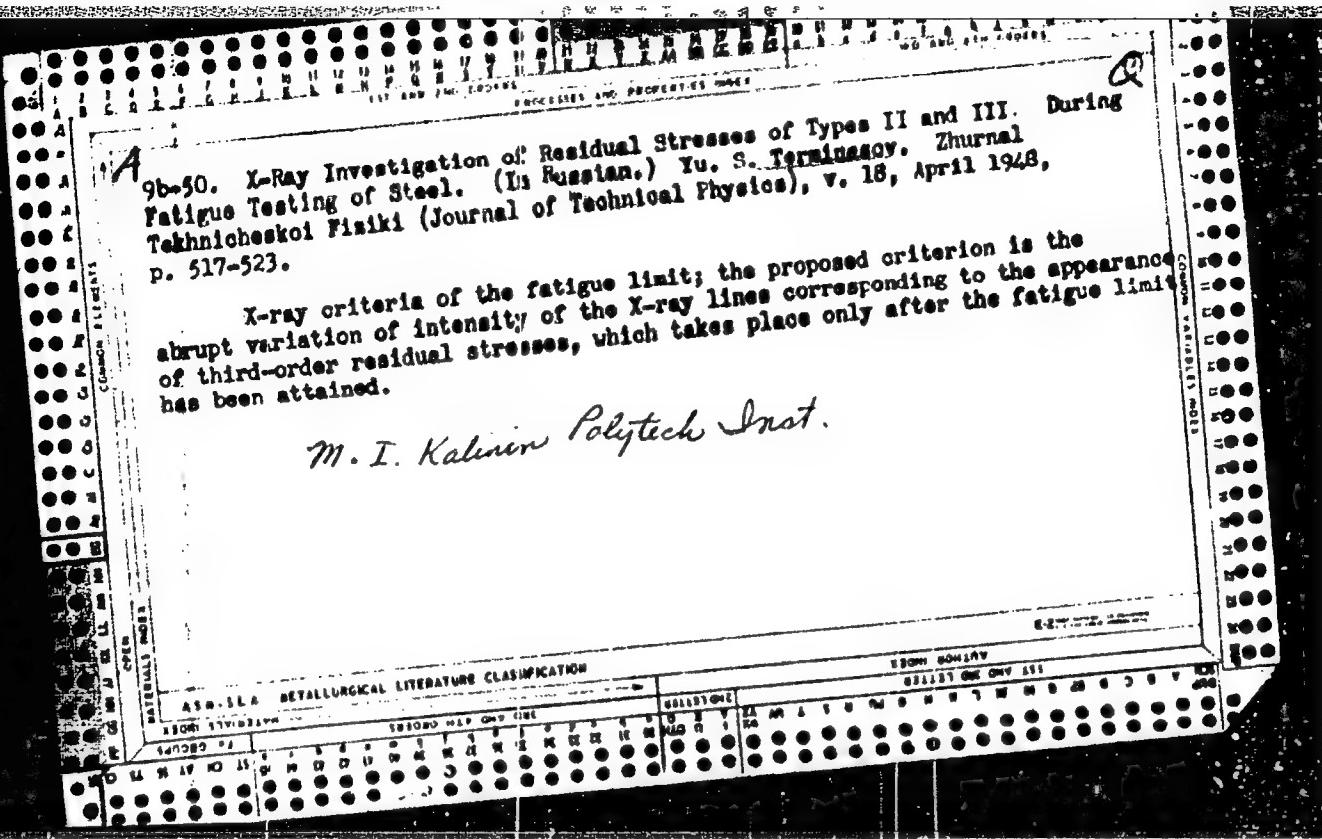
TITOV, V. S.

Mos., Central Sci. Res. Inst., Min. Shipbuilding Ind. -cl.42-.
Mos., Lab. Phys. Metallurgy, Leningrad Polytech. Inst. "V. Malin", -1.41-1.
"Roentgenographical Investigation of the Deformations Under Conditions of Static and
Dynamic Compression," Zh.r. Tekh. Fiz., 14, Nos. 7-8, 1944;
"X-ray Research on Residual Voltage Types 2 and 3 in Steel Fatigue," Ibid., 15, No. 4,
1948.
"Roentgenographic Study of the Structure of Nickel Skeleton Catalysts," Dok. Akad. Nauk SSSR, No. 4, 1943;
"Residual Stresses Under Simple Tension," Zhur. Tekh. Fiz., 14, No. 10, 1948;
151 T 102, Assr. Ye. L.
"The State of Alpha-Iron in Tempered Martenite," Ibid., 19, No. 3, 1949.

9b-50. X-Ray Investigation of Residual Stresses of Types II and III. During Fatigue Testing of Steel. (In Russian.) Yu. S. Iermakov. Zhurnal Tekhnicheskoi Fiziki (Journal of Technical Physics), v. 18, April 1948, p. 517-523.

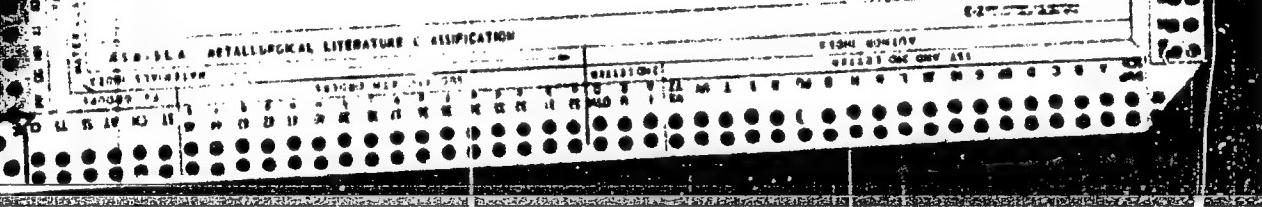
X-ray criteria of the fatigue limit; the proposed criterion is the abrupt variation of intensity of the X-ray lines corresponding to the appearance of third-order residual stresses, which takes place only after the fatigue limit has been attained.

M. I. Kalinin Polytech Inst.



4C-28. X-Ray Investigation of the Structure of Nickel "Skeleton" Catalyst. (In Russian.) Yu. S. Terminskiy and M. S. Beletskii. *Doklady Akademii Nauk SSSR* (Reports of the Academy of Sciences of the USSR), new ser., v. 63, Dec. 1, 1948, p. 411-413.

The residue remaining after leaching out the aluminum by means of a KOH solution from the compound Ni-A—that is, the nickel "skeleton" catalyst, represents dispersed crystals of nickel of hexagonal modification, in the crystal lattice of which is dissolved hydrogen.



TERMINASCV, YU. S.

33154 TERMINASCV, YU. S., AS'UR, YE. L. i DAVIDENKOV, N. N.

Ostatochnyye Napryazheniya Pri Prostom Rastyazhenii (Metallov). Zhurnal Tekhn. Fiziki, 1949, Vyp. 10, c. 1107-18 -Bibliogr: 7 Nazv.

SO: Letopis' Zhurnal'nykh Statey, Vol. 45, Moskva, 1949

PA 38/19793

TERMINASOV, YU. S.

Mar 19

USSR/Metals
Martensite
Crystals - Lattices - Deformation

"The State of Alpha-Iron in Tempered Martensite,"
L. S. Moroz, Yu. S. Terminasov, Cent Sci Res Inst,
Min of Shipbldg Ind, 8 pp

"Zhur Tekh Fiz" Vol XIX, No 3 p. 383-390

Found residual deformations of the crystal net-work of types II and III in the small crystals of alpha-iron. States that deformation of alpha-phase crystal lattice in tempered martensite causes sharp decrease in uniform deformation

38/19793

USSR/Metals (Contd)

Mar 19

during testing of samples under strain in compari-
son with annealed samples. Phenomenon is similar
to that which occurs during cold plastic deforma-
tion. Submitted 23 Dec 48.

38/19793

TERMINASOV, YU. S.

USSR/Physics - Stress Analysis

Oct 49

"Residual Stresses Under Simple Tension," Ye. I. Assur, N. N. Davidenkov, Yu. S. Terminasov, 12 pp

"Zhur Tekh Fiz" Vol XIX, No 10

Describes results of experiments set up to check Wood and Smith effect. In these experiments, measured by two methods, mechanical and X-Ray, residual stresses arising in surface layers of plastically elongated aluminum specimens. Experiments yielded (for specimens 3.4 mm thick) stress values reaching a value of 8 kg/sq mm which included only the external layer of metal 0.04-0.07 mm thick. Values obtained by both methods agreed well. Wood and Smith observed that the residual stresses were not confined. Submitted 2 Apr 79

PA 151T102

TERMINASOV, Iu. S.

S. A. Stepkin and Iu. S. Terminasov. X-ray method of measuring residual stresses in
welded articles. P. 96

Leningrad Inst. of
Tech. and Mech.
Processing

Discussion of above paper. P. 105

SO: Bulletin of the Acad. of Sciences, Izvestia (USSR) Series on Phys.
Vol. 15, No. 1 (1951)

TERMINASOV, Yu S. (Professor, Doctor of Physio-Mathematical Sciences)

The summer camp affiliate of the district officers' club conducts interesting propaganda among the troops in the camp. Recently Professor, Doctor of Physio-Mathematical Sciences Yu S. TERMINASOV, head of the Chair of Physics at the Engineering-Economics Institute imeni Molotov, gave a talk on "Achievements of Soviet Physics in the Study of the Construction of the Atomic Nucleus." (Krasnaya Zvezda, Moscow, 27 May 54).

SO: SUM No. 208, 9 Sep 1954;

USSR/Solid State Physics - Structure of Deformable Materials, E-8

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34808

Author: Terminasov, Yu. S., Anosova, K. I., Mamontov, Ye. A.

Institution: None

Title: X-Ray Diffraction Investigation of the Mechanism of Damage of Ferrous and Nonferrous Metals by Fatigue

Original Periodical: Uch. zap. Leningr. gos. ped. in-t., 1955, 3, 176-179

Abstract: An x-ray diffraction determination was made of the crystallite stresses and distortions of the atomic lattice of specimens of steel of 3 different grades, and also of brass, phosphor bronze, and red copper. The criterion for fatigue to stresses of the III kind, established previously by Terminasov, were confirmed for the 30 and U-10 grade steels. It was observed that in the case of a steel specimen with a chromium coating the fatigue crack originates in the inside layers of the coating, and the outer layers are damaged only in the final fracture. For specimens made of nonferrous metals one observes an increase in the stresses of the II and III kind with increasing number of cycles. The generality of the laws characterizing the fatigue processes in various metals has been established.

/ 4 /

- 1 -

TERMINASOV, Yu. S., doktor fiziko-matematicheskikh nauk, professor; FILATOV, N.V., kandidat fiziko-matematicheskikh nauk.

X-ray analysis of metal surface layers machined by grinding.
Trudy LIET no.10:155-167 '55. (MLRA 9:8)
(Surfaces (Technology)) (Metallography)

TERMINASOV, Yu. S., doktor fiziko-matematicheskikh nauk, professor;
TUZOV, L.V., kandidat fiziko-matematicheskikh nauk, dotsent;
POLTAVSKIY, A.V., kandidat fiziko-matematicheskikh nauk, dotsent.

Radiographic investigation of the quality of surfaces subjected to
milling and fine turning. Trudy LIMI no.13:125-144 '56.
(Surfaces (Technology)) (Radiography) (MIRA 10:8)
(Metal cutting)

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 9, p 166 (USSR) SOV/124-57-9-11079

AUTHORS: Terminasov, Yu. S., Tuzov, L. V.

TITLE: X-ray Investigation of Residual Stresses of the Second and Third Kind
in the Surface-strain Zone of Metal After Milling (Rentgenografiches-
koye issledovaniye ostatochnykh napryazheniy vtorogo i tret'yego roda
v deformirovannoy poverkhnostnoy zone metalla, obrabotannogo
frezerovaniyem)

PERIODICAL: Uch. zap. Leningr. gos. ped. in-t, 1956, Vol 125, pp 3-29

ABSTRACT: An X-ray investigation was conducted on the plastic strains in the
surface layers of Nr-40 steel produced by working it with a cylindrical
millng cutter. Before milling the specimens were annealed at 750-
800°C. The study was conducted with cobalt K_{α} -radiation by means
of the back-reflection method. Circular diaphragms with a diameter
of 0.6 mm were used. After X-ray photography the surface layer was
etched electrolytically and then X-ray-photographed again. The pro-
cess was repeated several times. The residual stresses of the second
kind were assessed according to the variation in width of the inter-
ference line (310), those of the third kind according to the variation in

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SOV/124-57-9-11079

X-ray Investigation of Residual Stresses of the Second and Third Kind (cont.)

the area ratio of the microphotometric curves $I_{(310)}/I_{(220)}$ corresponding to the interference lines (310) and (220). It was discovered that the depth of residual stress penetration is dependent upon certain factors determined by the milling operation. These are as follows: 1) An increase in the cutting depth of the milling head from 1 to 10 mm resulted in a proportional increase in the depth of the residual-stress penetration, and 2) a similar phenomenon takes place with an increase in the rate of feed from 0.022mm per tooth up to 0.18 mm per tooth. The authors attribute this to the fact that there is an increase in the milling force and a consequent increase of plastic strain in either case. It was established that when a milling speed of 230 mm per minute is employed the depth of residual-stress penetration attains a value of 500 μ . Compared to normal milling speed this value represents a 150% increase, over the residual-stress penetration depth at normal milling speeds. With a further increase in the milling speed from 230 to 527 mm per minute the depth of the residual-stress penetration decreases. The authors state that milling down makes the residual stresses less pronounced and the depth of penetration smaller as compared to milling up. In all cases it was established that stresses of the second kind appear at a greater depth than those of the third kind. Because of that the authors consider that stresses of the third kind appear only in those layers of a metal where stresses of the second kind attain a Card 2/3

SOV/124-57-9-11079
X-ray Investigation of Residual Stresses of the Second and Third Kind (cont.)

specific value. It is shown also that the microhardness method is less sensitive than the X-ray method. The rate of microhardness variation with depth has approximately the same character as the variation of the stresses of the third kind. This forms the basis of the deduction that the stresses of the third kind are basically responsible for the work-hardening of the surface layers of a metal.

V. G. Lyuttsau

Card 3/3

TERMINASOV, Yu.S.; YAKHONTOV, A.G.; POLTAVSKIY, A.V.

X-ray analysis of the quality of ground and finish-turned
metal surfaces. Uch. zap. Ped. inst. Gerts. 125:49-54 '56.
(MLRA 9:12)

(Metallurgy)

Terminasov, Yu. S.

USSR Solid State Physics - Structure of Deformable Materials. E-9

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11852

Author : Smirnova, T.N., Terminasov, Yu.S.

Inst : Leningrad Engineering-Economic Institute, USSR.

Title : X-ray Diffraction Investigation of Plastic Deformation of Metals in Static and Dynamics Compression.

Orig Pub : Izv. AN SSSR, ser. fiz., 1956, 20, No 6, 664-670

Abstract : An investigation was made of steel specimens St2 and U8, of commercial iron, and of aluminum. The specimens were exposed to X-ray diffraction. The X-ray patterns were examined in a MF-2 microphotometer. The crystallite distortions were estimated from the width of the interference lines, and the elementary distortions of the atomic lattice from the ratio of the areas of the corresponding lines. For all the investigated materials, the crystallite

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USSR/Solid State Physics - Structure of Deformable Materials.

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 11852

E-9

and elementary distortions turned out to be greater for statically-deformed specimens than for dynamically-deformed specimens. This fact can be explained by thermal relaxation, which plays a great role in dynamic deformation. It was also observed that the residual distortion of the crystalline lattice stops growing long before the fracture of the specimen.

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CIA-RDP86-00513R001755420001-6"

Terminasov, Yu. S.

USSR / Structure of Deformed Materials,

E-8

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9389

Author : Terminasov, Yu. S., Feklistov, G.A.

Inst : State Pedagogical Institute, Leningrad USSR

Title : X-Ray Diffraction Investigation of the Mechanism of Thermal Action on Plastically Deformed Metals.

Orig Pub : Izv. AN SSSR, ser. fiz., 1956, 20, No 6, 695-699

Abstract : Specimens made of St40 steel, aluminum, and LS59-1 brass were subjected to compression at room temperature and X-ray photographs were taken directly after the deformation and after annealing in a special vacuum furnace. The crystallite distortions were estimated from the ratio of the intensities of the corresponding lines to the intensity of the background. It was observed that the process of removal of the distortion is most intense during the first instant of annealing. Afterwards, the remaining distortions stabilize. The speed of restoration of the lattice increases with increasing initial

Card : 1/2

USSR / Structure of Deformed Materials.

E-8

Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9389

Abstract : distortion of the lattice. For all the investigated specimens, the recrystallization process was preceded by a total removal of the crystalline distortions and by considerable removal of the elementary distortions.

Card : 2/2

ЛУКИНА СЕВ, ю. с.

Category : USSR/Solid State Physics - Structure of Deformable Materials

E-8

Abs Jour : Ref Zhur - Fizika, No 3, 1957, No 6734

Author : Terminasov, Yu.S., Yakhontov, A.G., Foltevskiy, A.V.

Inst : Leningrad Engineering-Economic Institute, USSR

Title : X-ray Diffraction Investigation of the Surface Quality of Metals, Treated by Grinding and Fine Cutting.

Orig Pub : Izv. AN SSSR, ser. fiz., 1955, 30, No 6, 689-692

Abstract : An X-ray-diffraction method (using the broadening and attenuation of the interference lines), and the microhardness method were used to study the dependence of the intensity of hardening on the metal surface and the distribution of the hardening through the thickness of the surface layer on the technological treatment conditions. Grinding or cutting the lathe strengthens the surface layer of the metal, this being evidenced by an increase in the microhardness by 30 -- 70%, a broadening of the diffraction lines by 100---200%, and a reduction in the relative intensity of the lines by 40 -- 76%, depending on the working conditions. The width of the

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Category : USSR/Solid State Physics - Structure of Deformable Materials

E-2

Abs Jour : Rof Zhur - Fizika, No 3, 1957, No 6734

surface zone of a metal with a distorted structure, reaches 120 microns in the case of grinding, and approximately 200 microns in the case of fine cutting in the lathe. The authors believe that the degree and thickness of the strengthened surface layer of a specimen can be adjusted by changing the depth of the cut.

Card : 2/2

TERMINASOV, YU. S.

Economist-Engineer Institute, Leningrad

"X-Ray Investigation of Metal Structure Distortions Due Static and
Dynamic Contraction by Room and Low Temperatures" (Section 11-3) a paper submitted
at the General Assembly and International Congress of Crystallography, 10-19 Jul 57
Montreal, Canada.

C-3,800,189

TERMINASOV, YU. S. and GALPERIN, E. L.

The National Committee for Crystallography of the USSR

"Crystal Structure Changes of Steel During Hot and Cold Treatment"
(Section 5-10) a paper submitted at the General Assembly and International Congress
of Crystallography, 10-19 Jul 57, Montreal, Canada.

C-3,800,189

TERMINASOV, Yu. S

137-58-3-6166

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 245 (USSR)

AUTHORS: Terminasov, Yu.S., Komarov, A.I.

TITLE: X-ray Diffraction Studies of Surface Layers of Metals Subjected
to Dry Friction (Rentgenograficheskoye issledovaniye poverkh-
nostnykh sloyev metallov pri sukhom trenii)

PERIODICAL: Uch. zap. Leningrad. gos. ped. in-t im. A.I. Gertseva, 1957,
Nr 140, pp 58-59

ABSTRACT: X-ray diffraction methods, employing an Al standard and photographic reversal in conjunction with Co-K α irradiation, were employed in order to determine residual stresses of classes II and III in brass and 45-type steel. Specimens were subjected to dry friction under various pressures and at different velocities on a special machine. Distribution of the residual stresses was studied by means of subjecting successive layers of metal to electrolytic etching. It is established that residual stresses of classes II and III, due to friction, increase with increasing pressures up to a certain magnitude which is determined by the velocity of friction. Any further increase in pressure may reduce the extent of lattice distortion, i.e., produce a weakening of the

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137-58-3-6166

X-ray Diffraction Studies of Surface Layers of Metals (cont.)

surface. The velocity of friction affects both the depth and the extent of cold hardening, and the cold hardening, in turn, influences wear-resistant properties of the metal.

A.F.

Card 2/2

TERMINASOV, YU. S.

70-4-11/16

AUTHORS: Terminasov, Yu.S. and Mindukshev, V.F.

TITLE: X-ray Diffraction Analysis of the Distortions of the Structures of Metals on Static and Dynamic Compression under Room and Low Temperature Conditions.

PERIODICAL: Kristallografiya, 1957, Vol.2, Nr 4, pp.514-518 (USSR).

ABSTRACT: Deformation of metals at liquid N₂ temperatures causes a significant reduction in the influence of thermal rest. At these low temperatures fragmentation of the crystal blocks is greater and gives rise to greater crystalline strains than occurs when the metal is deformed at room temperature. At low temperature the influence of the rate of deformation becomes negligible and therefore there is no difference between the effects of static and of dynamic compression as is the case at room temperature. The specimens used were technical grade duralumin and electrolytic copper in the form of cylinders 10 mm diameter and 15 mm thick. Back reflection X-ray pictures were taken and also recordings from an automatic diffractometer with Cu radiation. The 511 line of the dural and the 331 and 420 line of the copper were used, their widths being measured for various degrees of deformation up to 50%. The maximum line broadening for the dural was (for

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70-4-11/16

X-ray Diffraction Analysis of the Distortions of the Structures of Metals on Static and Dynamic Compression under Room and Low Temperature Conditions.

the dynamic compression at room temperature) 52.6% at 49.4% compression. For copper the broadening of the 331 line for a static deformation of 57.4% reached 31% and at liquid N₂ temperature 44%. Graphs of the size of the crystal blocks against percentage deformation are given. The lattice distortion for room temperature compression reached 1.10×10^{-3} for static compression as against 0.90×10^{-3} for the dynamic compression (dural) and 0.75 and 0.80×10^{-3} as the corresponding figures for copper. The figures for low temperature deformation are 1.20×10^{-3} for static and 1.16×10^{-3} for dynamic compression of dural and 0.80 and 0.90×10^{-3} for copper. There are 2 figures and 15 references, 3 of which are Slavic.

ASSOCIATION: V.M.Molotov Engineering-Economic Institute, Leningrad.
(Leningradskiy Inzhenerno-ekonomicheskiy Institut im. V. M. Molotova).

SUBMITTED: February 22, 1957.

AVAILABLE: Library of Congress.

Card 2/2

TERMINASOV, Yu. S.

70-4-12/16

AUTHOR: Gal'perin, Ye.L, and Terminasov, Yu.S.

TITLE: Crystal structure changes in steel caused by heat treatment
and cold working. (Izmenenije kristallicheskoy struktury
stali pri kholodnoj i termicheskoy obrabotkakh)

PERIODICAL: "Kristallografiya" (Crystalllography), 1957,
Vol.2, No.4, pp. 519 - 525 (U.S.S.R.)

ABSTRACT: Changes of different structural characteristics, such as dispersion, elastic and static distortions of the α -phase lattice, characteristic temperature and carbide-phase state, were examined during plastic deformation and heat treatment of silicon steel 55C_2 .

Steel samples were statically compressed, and a part of them was filed (after annealing) in order to obtain powder. The roentgenographic part included photographic and ionisation measurements of the diffraction maxima produced by Fe K α and Mo K α radiations.

Effects of fragmentation and elastic distortions, responsible for the diffraction-line widening, were separated analytically and by means of harmonic analysis.

Both methods gave a satisfactory coincidence of the elastic distortion data. The calculated crystallite dimensions depended essentially on the choice of the analytic function.

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70-4-12/16

Crystal structure changes in steel caused by heat treatment and cold working. (Cont.)

The function $1/(1 + Kx^2)^2$ was found to be the most suitable. Static distortions of the atomic lattice were rated according to changes in the diffraction-line intensity for the lines (110) and (220) of Fe Ka radiation and $6 \leq \Sigma h^2 \leq 38$ of Mo Ka radiation. The extinction effect was taken into account and it was found that this effect is practically unimportant for Mo radiation. The extinction effect provoked a 10-15% intensity change of the (110) line of Fe Ka radiation.

No regular intensity changes were found in the course of plastic deformation, which apparently proves the absence of a direct connection between static distortions and $\sqrt{Us^2 t}$.

An attempt was made to state a relationship between the structural characteristics of the samples examined and their mechanical properties, e.g. microhardness. It was found that the hardening of deformed steel is due essentially to sub-microscopic structural non-uniformities appearing in the course of the α -phase fragmentation and the formation of severely distorted boundary regions.

An identical method was applied to the examination of oil-hardened steel samples tempered at 200-700 C for 1 hour. The carbide sediment from a part of the samples was obtained and

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70-4-12/16

Crystal structure changes in steel caused by heat treatment and cold working. (Cont.)

examined by means of Fe K_a radiation.

Maximum changes of the steel 55C₂ characteristic temperature, caused by heat treatment, do not exceed 3-4%.

A regular diffraction intensity change is found in the course of tempering which allows static distortions to be rated according to $\sqrt{U^2 st}$.

Tempering of hardened steel 55C₂ at less than 400 C causes the formation of an intermediate carbide with a hexagonal lattice ($a = 2.72$, $c = 4.35 \text{ \AA}$). At higher temperatures this carbide transforms actively to cementite.

The main effect on the tempered steel hardening has several factors: carbon state, different admixtures and their distribution, and static distortions of the α -phase lattice.

There are 3 figures and 2 tables, and 21 references, 12 of which are Slavic.

SUBMITTED: February 22, 1957.

AVAILABLE: Library of Congress.

Card 3/3

Terminasov, Yu.S.

70-5-24/31

AUTHORS: Gal'perin, Ye.L. and Terminasov, Yu.S.

TITLE: On the State of Carbon in Annealed Silicon Steel
(O sostoyanii ugleroda v otpushchennoy kremniastoy stali)

PUBLICATION: Kristallografiya, 1957, Vol.2, No.5, pp. 693 - 695 (USSR)

ABSTRACT: Carbide deposits were extracted from annealed silicon steel 55C₂ (0.55% C, 1.84% Si) by an electrolytic method and

X-ray powder photographs were taken. The steel had been quenched and then annealed at temperatures between 300 and 700 °C for an hour. The powder photographs showed spacings of 2.35 m, 2.18 m, 2.07 s, 1.59 w, 1.37 w and 1.24 w which could be indexed on the basis of a hexagonal cell with $a = 2.72$ and $c = 4.35 \text{ \AA}$. This compound occurred when the steel was annealed below 400 °C. Between 400 and 500 °C this presumed intermediate, metastable carbide transforms to platy cementite and above 500 °C intensive coagulation of the carbide phase takes place resulting in a transformation to three-dimensional crystals. There are 1 plate, 1 table and 8 references, 7 of which are Russian.

ASSOCIATION: A.I. Gertsen State Pedagogical Institute, Leningrad.
(Leningradskiy Gosudarstvennyy Pedagogicheskiy
Institut im. A.I. Gertseva)

ord 1/2

On the State of Carbon in Annealed Silicon Steel. 70-5-24/31

SUBMITTED: January 3, 1957

AVAILABLE: Library of Congress
Card 2/2

TERMINASOV, Yu. S.

57-6-32/36

AUTHOR: GAL'PERIN, Ye. L., TERMINASOV, Yu. S.
TITLE: The Effect of Extinction on X-Ray Interference Intensity in
Steel Investigation. (O vliyanii ekstinktsii na intensivnost'
rentgenovskikh interferentsiy pri issledovanii stali, Russian)
PERIODICAL: Zhurnal Tekhn. Fiz., 1957, Vol 27, Nr 6, pp 1379 - 1385
(U.S.S.R.)

ABSTRACT: The experimental results of the heat-treated steels 55C₂ and 20 are given. Cylindrical samples with a diameter of 2 mm and a length of 20 mm were hardened: 55C₂ at 900°C in oil and steel 20 at 930°C in water. One part of the samples was tempered for one hour at 700°C, the other part was annealed for 4 hours at 850°C. Cylinders with a diameter of 0,5 mm were obtained from heat treated samples of both types of steel by means of photo-etching in a phosphor-chrome electrolyte. The samples were photographed in a RKD chamber with a diameter of 57,3 mm under Mo-radiation. AGFA films were used. In order to eliminate the K_α-radiation from the spectrum and in order to decrease the intensity of the through-going bottom an Nb-filter of a thickness of 0,1 mm was used. The absorption of the secondary characteristic radiation was carried out by means of an aluminum foil of a thickness of 0,3 mm. The investigations showed that in con-

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The Effect of Extinction on X-Ray Interference Intensity in
Steel Investigation. 57-6-32/36

sequence of the different treatments in the case of Mo-radiation the influence of extinction can be disregarded in those cases in which the maximum measurements of the blocks in the samples developing coherence are not more than $1 + 2 \cdot 10^{-4}$ cm and where those reflexes are investigated which correspond to an angle of $\delta > 15^\circ$. If soft rays are used (Co, Fe, Cr) a size of block of the 10^{-4} order can be sufficient to cause a remarkable decrease of the intensity of the interference lines of planes with a great reflexion capacity even if the angles are $\delta > 15 + 25^\circ$. (With 2 illustrations, 2 tables, and 6 Slavic references).

ASSOCIATION: A.I.GERZENS, Leningrad Pedagogic Institute, Faculty for General Physics. (Leningradskiy Gos. pedagogicheskiy institut im. A.Gertsena, Kafedra obshchey fiziki, Russian)

PRESENTED BY:

SUBMITTED: 29.12.1956

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: Gal'perin, Ye.L., Terminasov, Yu.S. SOV/163-59-1 47/53

TITLE: On the Distortion of the Crystal Lattices of Thermally Treated Steels (Ob iskazheniyakh kristallicheskoy reshetki termicheski obrabotannoy stali)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 1, pp 252 ~ 255 (USSR)

ABSTRACT: In the present investigation the influence of the temperature on the tempered steel 55C2 (0,55 % C and 1,84 % Si) as well as on the dimensions of the static distorted lattices of the α -phase was determined. The results showed that with the increase in temperature the static distortion of the lattice of the α -phase does not become so intense. In the annealing of hardened steel at 400° C, at which temperature the total amount of carbon is already driven off from the solid phase, the magnitude $\sqrt{u_{st}^{-2}}$ was found to be greater than $\sqrt{u_{\alpha}^{-2}}$.

The dependence of $\ln \frac{J_{hkl}^{\text{thermally treated}}}{J_{700^{\circ}}} \text{ on } \sum h_1^2 (k_{\alpha} - M_0)$

Card 1/2

On the Distortion of the Crystal Lattices of Thermally
Treated Steels

SOV/163-58-1-47/53

was determined for thermally treated steel samples 55C2 and for
the steel No.20.

The greatest decrease in the magnitude of static distortion was
found within the temperature range of 300 - 700° C, at which
temperature an intense increase in the α -phase occurs.

The values for $\sqrt{\frac{I}{I_0}}$ were calculated by the measuring of the in-
tensity of the radiations due to the lines [110] and [220] according
to the corrections introduced for the extinction of the line [110].
There are 2 figures, 1 table, and 13 references, 10 of which are
Soviet.

ASSOCIATION: Leningradskiy Gosudarstvennyy pedagogicheskiy institut (Leningrad
State Pedagogic Institute)

SUBMITTED: October 1, 1957

Card 2/2

TERMINASOV, Yu.S.; TSYGANOK, N.F.

Effect of the initial structure of steel on the development of atomic lattice deformations when exposed to static and dynamic compression. Izv. vys. ucheb. zav.; fiz. no.2:3-8 '58. (MIRA 11:6)

1. Leningradskiy gosudarstvennyy pedinstitut im. A.I. Gertsena.
(Steel--Testing) (Deformations (Mechanics))

TERMINASOV, Yu.S.; TSYGANOK, N.P.

Combined effect of hardening and static and dynamic compressions
on further deformations in the crystalline structure of metals.
Izv. vys. ucheb. zav., fiz., no.2:9-14 '58. (MIRA 11:6)
(Deformations (Mechanics)) (Steel--Testing)

AUTHORS: Terminasov, Yu. S., Feklistov, G. A. SOV/163-58-2-35/46

TITLE: Investigating the Plastic Deformation of Aluminum at Liquid Air Temperature(Issledovaniye plasticheskoy deformatsii alyuminiya pri temperature zhidkogo vozdukha)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 2, pp. 196 - 199 (USSR)

ABSTRACT: In the present paper an investigation of the crystal lattice in the plastic deformation of aluminum at low temperatures was carried out by means of radiographic methods as well as by the microhardness method. The aluminum sample GOST 4784-49 investigated had the following composition: Al - 97,58%, Si - 0,71%, Mn - 0,31%, Mg - 0,63%, Fe - 0,52%, Zn - traces, Cu - 0,25%. The samples were subjected to deformation at a pressure of 30 t in special chambers. The deformation of aluminum at lower temperatures differs to a great extent from that at room temperature. In the second type of deformation an increased deformation of the lattices occurs. In the third type of deformation not only a deformation of the

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lattices occurs but also the character of the deformation changes. This difference between the second and third type of deformation is most probably due to the different influence of the heat. The plastic deformation of aluminum at the temperature of liquid air is in all ranges of the deformation accompanied by an increase in microhardness. There are 3 figures and 3 references, 3 of which are Soviet.

ASSOCIATION: Leningradskiy pedagogicheskiy institut (Leningrad Pedagogical Institute)

SUBMITTED: October 1, 1957

Card 2/2

SERGEYEVA, V.D.; TERMINASOV, Yu.S.

X-ray investigation of block structure and microdeformations
in steel exposed to rolling friction. Izv. vys. ucheb. zav.;
fiz. no.3:128-134 '58. (MIRA 11:9)

1. Leningradskiy pedagogicheskiy institut im. A.I. Gertsena.
(Steel--Metallography)

18(7)

AUTHORS: Myasnikov, Yu. G., Terminasov, Yu. S. SOV/163-58-4-35/47

TITLE: X-ray Investigation of Structural Distortions of Steel When Cleaning With a Blast of Metal Shot (Rentgenograficheskoye issledovaniye iskazheniy struktury stali pri drobestrueynoy obrabotke)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4, pp 203-206 (USSR)

ABSTRACT: This investigation concerned the influence of a surface treatment with metal shot (scrap ?) on the state of the atomic crystal lattice of metals of great hardness. All effects were separated according to the method by G. V. Kurdyumov and L. I. Lysak (Refs 2, 3, 4), as well as the method of harmonic analysis (Refs 5, 6). The following facts were ascertained by the experiments: 1) In hardened samples of steel 45 KhNMFA which had been tempered at 400° and subjected to cleaning with a blast of metal shot, no increase in crystalline distortions was ascertained at an increase in the operating time. 2) The methods of harmonic analysis and the methods developed by Kurdyumov - Lysak used for determining the crystal block

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X-ray Investigation of Structural Distortions of
Steel When Cleaning With a Blast of Metal Shot

SOV/163-58-4-35/47

measurements showed that the size of blocks first decreases with the increase in operating time, but then stabilizes. 3) The numerical values of the lattice distortions (crystalline distortions) and of the block size were determined by two methods independent of each other. They are approximately equal in both cases. There are 2 figures, 2 tables, and 6 references, 5 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy pedagogicheskiy institut
(Leningrad State Pedagogic Institute)

SUBMITTED: January 21, 1958

Card 2/2

RGV/139-38-5-1/35

AUTHORS: Sergeyeva V. D. and Terminasov, Yu. S.

TITLE: X-ray Diffraction Study of Properties of Surface Layers of Steel Subjected to Friction Rolling as a Function of Duration of the Rolling Process (Rentgenograficheskoye issledovaniye poverkhnostnykh sloyev stali pri trenii kacheniya v zavisimosti ot prcdelzhitel'nosti obkatki)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, fizika, 1958, Nr 5, pp 3-7 (USSR)

ABSTRACT: This paper reports X-ray diffraction study of the deformation of the crystal lattice and the grain structure in the surface layers of "Steel 45" subjected to friction rolling without lubrication. The authors determined also the change of microhardness and the amount of wear as a function of the duration of the rolling process. The samples and the apparatus used were described by the authors in earlier work (Ref.1). Samples were rolled at the rate of 1 m/sec under a load of 60 kg for 1, 3, 5, 6, 8 and 11 hours. Microhardness was measured using a PMT apparatus with a 100 g load, and the weight of samples before rolling and after 1, 3, 5, 9 and 11 hours of rolling was determined. X-ray diffraction patterns were recorded using ionisation and photographic methods. In the ionisation method, the interference lines $[110]$ and $[220]$ ob-

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X-ray Diffraction Study of Properties of Surface Layers of Steel
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Process

tained from K_{α} -radiation of iron were recorded. In the photographic method the [310] interference line of the cobalt K_{α} -radiation was recorded using a KROS-1 camera. Each experimental point obtained from the X-ray data represented an average of 24 measurements. To separate the effects which cause broadening of the interference lines, the harmonic analysis method (Refs.2-4) was used. It was found that the surface layers of "Steel 45" are plastically deformed by friction rolling and that this deformation is accompanied by breaking-up and deformation of crystal grains (Figs.1-5). The process of deformation and breaking of crystal grains is most intense during the first three hours of rolling (Fig.3); after this initial stage the process of deformation occurs at a constant rate. Microhardness increases rapidly during the first three

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SOV/159-58-5-1/35

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hours of rolling and then settles to a steady rate of change
(Fig.6). The amount of wear increases linearly with the
duration of rolling (Fig.6). There are 6 figures and 9
references, 4 of which are Soviet, 4 English and 1 inter-
national.

ASSOCIATION: Leningradskiy pedinstitut imeni A. I. Gertseva
(Leningrad Pedagogical Institute imeni A. I. Gertsen)

SUBMITTED: January 16, 1958.

Card 3/3

AUTHORS: Terminasov, Yu. S. and Yakhontov, A.G. 129-58-5-11/17

TITLE: Influence of Technological Factors on the Thickness of Cold-hardened Layer During Grinding (O vliyanii tekhnologicheskikh faktorov na glubinu naklepa pri shlifovanii)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, Nr 5,
pp 40-43 (USSR)

ABSTRACT: The results are evaluated of investigations of the internal layers located underneath a ground surface of annealed "U8" steel. To remove the individual layers, successive electro-chemical etching was applied and the degree of work hardening of the layer was evaluated directly on the basis of the changes in the micro-hardness (measured by Candidate of Technical Sciences A. A. Matalin). In addition, distortions of the atomic-crystal lattice were determined by X-ray structural analysis. Thereby it became possible to plot curves of the changes of the micro-hardness and of the distribution of the atomic lattice underneath the ground surface. In Figure 1 the dependence is graphed of the width and the relative intensity of the interference lines of the $(\bar{3}10)K_{\alpha}$ -doublet as a function of the thickness of the removed surface layer for one

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Influence of Technological Factors on the Thickness of Cold-hardened Layer During Grinding

specific grinding regime. In Fig.2 the same dependence is graphed for various depths of grinding. In Fig.3 the dependence of the relative intensity of the interference on the thickness of the removed layer for various depth

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hardness on the thickness of the removed layer for various grinding depths is graphed in Fig.4. In Fig.5 the dependence is graphed of the depth of work hardening on the depth of grinding for various feed rates. It was established that the grinding produces in the surface layer a certain distribution of deforming forces.

Assuming that this distribution corresponds to curve 1 of Fig.6 (distribution of the deforming forces in the surface zone of the metal during grinding) and curve 2 is the experimentally established dependence between the deforming forces and the work hardening, it is possible to determine the distribution of the work hardening under the surface layer by simple geometrical means (curve 3). Analysis of this simplified scheme allows

Card 2/3 certain conclusions which are substantiated by the results

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The Influence of Technological Factors on the Thickness of
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obtained in the here described work. The thickness of the layer with a distorted structure is determined by the depth to which the stresses exceeding the yield point penetrate. The character of the distribution of the distortions of the atomic lattice will depend on the distribution of the stresses in the metal during machining; in the case of light grinding regimes, a sharp transition should be observed between the distorted structure in the surface layer and the non-deformed one in the internal layers. The depth of intensive work hardening changes as a function of the grinding regime between 10 and 100 μ ; the maximum distortion of the structure and the changes in the micro-hardness are observed in the about 10 μ thick surface layer. For producing a sufficiently thick and sufficiently highly work hardened surface layer, it is necessary to grind using large cutting depths. Minimum work hardening is obtained if high cutting speeds with very low depths of cut are used.

Card 3/3 There are 6 figures and 2 references, both of which are Soviet.

AVAILABLE: Library of Congress. 1. Steel-Effects of grinding 2. Steel-Hardening 3. Electrolytic etching-Applications 4. Steel-X-ray analysis

AVANAS'YEV, K.F.; TERMINASOV, Yu.S.

X ray examination of distortions of atomic crystal lattices in
fractures in steel parts due to fatigue. Izv.AN Kir.SSR no.6:
79-88 '58. (MIMA 11:12)
(Steel--Metallography)

IGNATENKO, P.I., kand.fiz.-mat.nauk; TERMINASOV, Yu.S., doktor fiz.-mat.nauk,
prof.

Investigating the depth of hardened layers in worked-in steel
surfaces. Izv.vys.ucheb.zav.; mashinostr. no.6:178-183 '58.
(MIRA 12:8)

1. Leningradskiy inzhenerno-ekonomicheskiy institut.
(Surfaces (Technology))

SOV/122-58-8-15/29

AUTHORS: Terminasov, Yu.S., Doctor of Physical and Mathematical Sciences, Professor, and Ignatenko, P.I., Candidate of Physical and Mathematical Sciences

TITLE: Relations between the Wear Resistance, the Microhardness and the Distortions of the Metal Crystal Lattice (Svyaz' mezhdu iznosostoykost'yu, mikrotyverdost'yu i iskazheniyami kristallicheskoy reshetki metalla)

PERIODICAL: Vestnik mashinostroyeniya, 1958, Nr 8, pp 45-46 (USSR)

ABSTRACT: A study was carried out at the Leningradskiy inzhenerno-ekonomicheskiy institut (Leningrad Engineering-Economics Institute) and is reported, wherein mechanical and X-ray spectroscopic methods were used to find a relation between the wear resistance and the condition of the surface layer as expressed by its microhardness and by distortions of its crystal lattice. Tool steel rings of 40 mm inside and 48 mm outside diameter were ground under different conditions to produce residual stresses of different sign. The specimens were tested on an Amaler wear machine either with or without lubricant. The tests are summarised in a linear relation between the weight of metal worn away and the degree of cold work existing at any time. The total

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cold work is equal to the initial cold work increased by the additional cold work caused by the wearing process. This relation holds in the running-in stage until a maximum amount of cold work is applied. It follows that with a given degree of initial cold work achieving the optimum surface roughness, microhardness and lattice distortion, the wear resistance ceases to depend on additional cold work.

There are 3 figures.

Card 2/2 1. Metals--Mechanical properties 2. Crystals--Distortion 3. Crystals
--Lattices 4. Metals--X-ray analysis 5. Metals--Spectra